Chapter 2
Global Environmental Change and the Crisis of Dominant Development Models: A Human Security-Centered Analysis

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Abstract During the last decades, the global environmental imbalance has reached an intolerable peak, producing devastating impacts on vulnerable regions and populations, historically considered as less responsible for its underlying causes. The growing scientific consensus on anthropogenic environmental change has led to the creation of some paradigmatic approaches aimed to address this issue, such as the 'sustainable development' principle and, more recently, the green economy. Nevertheless, policy responses to environmental change have been largely grounded in the dominant development models, those that are arguably to blame for this situation. The present chapter suggests that the global economic system is still unable to propose workable alternatives to reconsider the structural drivers that give rise to the environmental crisis and increasing social inequalities. It discusses the interrelations between environmental change and dominant development pathways, and demonstrates how the environmental discourse is still disregarding human and social issues or, more precisely, the inter-linkages between the growing social injustice and the ever-increasing environmental crisis. By recognizing that social and structural inequalities are among the important drivers of ecological crisis, this research emphasizes this tight relationship, and shows, in the meantime, how the environmental crisis is further widening the rich-poor gaps and creates new grounds

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for additional vulnerabilities. This leads to the conclusion that fighting social vulnerabilities must be at the heart of policy responses to the global environmental change. Based on this mutual interaction, this chapter argues that the latter is predominantly a human-security issue and, therefore, related responses should be people-centered.

Keywords Environmental change • Human security • Dominant development pathways • Paradigmatic shift • Intra and inter generational equity

1 Introduction

1.1 Interlinkages Between the Environmental Crisis and Dominant Economic Models

Human history bears testimony that environmental change can contribute to the collapse of civilizations. The world today is on the crossroads as global environmental change (GEC) is increasingly recognized by scientists, activists, and policy makers, as a reality threatening the future of mankind and ecosystem balance. Over the last decades, a widespread scientific and even political debate has been engaged on the influence of anthropogenic activities on accelerating environmental change and the degree of this responsibility compared to natural factors. Scientific data, evidence and worldwide research studies, consistent with each other, lead to a strong consensus that human factors are the main cause of increasing global warming, biodiversity loss, degradation of major ecosystems, etc. Different methods have been used for instance to estimate the degree of scientific consensus about human drivers of climate change – including surveys of experts (Doran and Zimmerman 2009; Cook et al. 2013a, b), and reviews of the peer-reviewed literature (Oreskes 2004; Anderegg et al. 2010; Cook et al. 2013a, b). Both methods converge on the following conclusion: 97 % or more of climate scientists are convinced that human-caused climate change is happening (Maibach et al. 2014). This conclusion is almost equal to the last confirmation made by the IPCC 5th Report (2013) about the scientific certainty that human activity is the dominant cause of observed warming since the mid-twentieth century and that this certainty is reaching 95 %.

It's currently firmly recognized that over the last two centuries, industrial and technological development, unprecedented demographic growth, and excessive urbanization have provoked a rapid growth of ecological degradation (Magdoff 2002; Wilson 1992; Reid and Miller 1989). It is obvious that during this period the Earth System has been under an intense pressure from the *Homosapiens*, equipped with sophisticated technologies, and pursuing never ending growth and opulence. The changes caused by nature's selfish exploitation by humans caught the attention

of experts and environmentalists and make them agree on the supremacy of human activity impacts on environment and biosphere, as compared to all natural factors.[1]

This unprecedented impact is now perceived as permanent, even on a geological timescale, and many scientists claim that since the industrial revolution, humans enter a new geological epoch called the 'Anthropocene' (Crutzen and Steffen 2002; Zalasiewicz et al. 2010) where they are the most powerful geological force. This new reality is making the history of planet Earth accelerating. In addition, human effects on natural environment are inducing a cascade-like changes: global warming; ice melting; sea level rise; extreme weather events; species loss; ecosystems destruction; soil erosion; crop and water-vector diseases; deforestation; depletion of natural resource; and so on.

Based on these facts, it is becoming increasingly convincing that the interrelations between anthropogenic activities and global environmental crisis are closely associated with dominant development models and the social disparities they produce. What is referred to here is the liberal market-based economy characterized by the hegemony of capitalistic paradigms (multinational firms, trade liberalization, profit and productivism, natural resources and fossil fuel combustion-depending economies, growth obsession, mass consumption, etc.). Furthermore, these dominant paradigms often concentrate wealth in the hands of a small minority, leading to a growing inequality and widening the category of poor and excluded people. Viewing GEC through the lens of social externalities widens the research agenda to vulnerability issues, and helps build global change projections based on scenarios that incorporate social considerations and gaps between rich and poor. This chapter intends to analyze these questions from a human security perspective.

1.2 Growing Inequality and Long Term Economic Costs as a Consequence

Environmental change affects human societies and economies in many negative ways. The first to feel and suffer from environmental change are the least privileged individuals and communities, and usually the least responsible for ecological degradation. The interconnections between the environmental crisis and economic development pathways result in a growing poverty, unequal repartition of wealth, exclusion and marginalization of vulnerable groups that, in turn, undermine human security. The observed reality in the Global South shows some disastrous manifestations of these interconnections. "The effects of climate change are being felt all over the planet, but not equally" (Annan 2015). According to the most recent data (Global

[1] Man and nature; or, Physical geography as modified by human action written by Georges Perkins Marsh in 1864 was one of the first books to argue about the impact of human action onthe environment.

Climate Risk Index 2014[2] and climate change vulnerability index 2013[3]), poor countries are already facing climate change effects, and experiencing its indirect harmful impacts such as extreme weather events, droughts, crop yields reduction and malnourishment. The poorest people in developing countries, heavily dependent on their natural environment are the most vulnerable. Climate change induces cascade-like effects, for instance: soil erosion and natural resource depletion lead to loss of income, thus accentuating rural poverty and forced migration and deepening the social vulnerability to shocks; water shortage and crop decrease cause food insecurity; air and water pollutions increase health insecurity; and so on.

The prevalent approach to environmental change has been – since the Rio Summit in 1992 – centered on making economic growth and environmental protection compatible. However, and despite the fact that the 'sustainable development' principle is multidimensional in nature (covering environmental, social, economic, cultural, and recently governance considerations), the dominant economic paradigm, mainly preoccupied with material economic growth (Floro 2012), has not paid sufficient attention to environmental considerations, social justice requirements and the well-being of current and future generations. The economic dimension of sustainable development has often dominated environmental and social ones.

At the same time, the global economy is correlated with the rise of large private multinational corporations exerting significant influence on public policies, focusing on profit maximization, and contributing to significant worldwide environmental damage (Donohoe 2003:578; Roach 2007). Accordingly, responses to current global crises pertaining to environment, social inequity, and growing wealth disparities may not be effective without the engagement of business actors.

While pursuing an endless and highly carbonized model of economic growth, environmental costs are rising and human well-being is decreasing. Some experts describe the current economic growth model as uneconomic (Daly 2005; Watson 2014) since it becomes as a goal in itself, with less potential to enhance environmental sustainability or to create social and economic opportunities. In addition to its high cost for environment – both in its over-consumption of finite resources and production of externalities such as waste – the world economic growth paradigm generates wealth for business actors while environmental and social costs are merely transferred to the poorest, to future generations and to non-human species. As Daly made it clear "uneconomic growth occurs when increases in production come at an expense in resources and well-being that is worth more than the items made" (Daly 2005:103) […]. The global economy is now so large that society can no longer safely pretend it operates within a limitless ecosystem. Developing an economy that can be sustained within the finite biosphere requires new ways of thinking (Daly 2005:100).

[2] According to Global Climate Risk Index 2015: "Of the ten most affected countries by extreme weather events (1994–2013), nine were developing countries in the low income or lower-middle income country group, while only one was classified as an upper-middle income country".

[3] Climate Change Vulnerability Index 2013 shows that the most vulnerable regions to climate change are situated in Africa, South Asia and Latin America.

The debate over these issues has been caught up for a long time between opposite views and perceptions regarding the interrelations between dominant development paths and global environmental change, explored in Sect. 2. Section 3 will explore the new paradigms brought by economists and environmentalists in order to cope with economy-environment dilemma, and the ways and extent to which decision-making processes translate the new paradigms. The last section presents and defends the human security-centered approach to environmental change as a 'global to local' (glocal) policy driver at a practical level. The main ambition is to reexamine the concepts of 'sustainable development' and 'green economy' pushing towards a reform agenda with a holistic approach focusing on human security, instead of solely focusing on macroeconomic solutions. We believe that the primary reason for concern about environmental change is the security and welfare of human populations (Barnett et al. 2010:10), and any global response should therefore be people-centered.

2 Dominant Development Paths and Global Environmental Change

Since the 1980s, and following the Bruntland Report "Our Common Future" (WCED 1987), and particularly after the United Nations Conference on Environment and Development held in 1992, the global debate on the environmental crisis between scientists, policymakers, and economists has been caught up in rhetoric discourses, while major economic players have continued to do business as usual, and policy makers to implement trade and financial liberalization and parallel oriented-market policies following the economic growth model.

In essence, the scientific debate on global environmental change came to a consensus on three main facts: *Primarily*, that the environment is changing at a very quick pace due to different environmental problems and damages; *secondly*, the environmental change is human-induced and all causes happen through a subset of proximate causes, which directly alter aspects of the environment in ways that have global effects (Stern et al. 1992); *thirdly*, the change is global in magnitude because it has and will have global consequences.

Given the weakness of achievements in cutting greenhouse gas emissions, it is obvious that the policy-driven debate and actions on GEC have not been practice-oriented and coherent with the recognition of the undeniable scientific evidence related to this issue. In fact, much of the political discourse has brought alarming conclusions into the public sphere, with an exclusive focus on reconciling economy and environment, seeking for instance to provide evidence that climate action itself is a source of benefits and investment opportunities. This pattern is highlighted by recent literature (Zokaei et al. 2013) and institutional reports (Carbon Disclosure Project 2014).

2.1 The Triumph of Science-Based Approach: What Next?

For a long time, the scientific debate about the GEC prevailed over the political debate. The scientific investigations focused on observations, studies and model simulations produced by imminent scientists and research institutions around the world. The lack of global coordination and modeling analysis led countries under the head of the United Nations Environmental Program (UNEP) and the World Meteorological Organization (WMO) to establish the Intergovernmental Panel on Climate Change (IPCC) in 1988 with three working groups in order to assess the state of existing knowledge about climate change – its science, the environmental, economic and social impacts – and possible response strategies, thus contributing substantially to global climate governance.

Since then, the scientific debate has become much more universal and coordinated, bringing together experts from both natural and social sciences. Conclusions are based on the assessment and the peer review of scientific literature on climate change carried out across the world, including global scale observations (direct measurements and remote sensing from satellites and other platforms) and model simulations.

New research carried out by independent and credible scientists provided an increasing body of evidence and scientific unanimity about the reality of the global warming and its impact on all natural systems (GEC) on one hand, and the interrelations between GEC and human activities – mainly industry, mining, transport,agriculture, and deforestation responsible for a significant increase in greenhouse gases (GHG) – on the other hand.

Anthropogenic activities are mainly responsible for the recent increase of atmospheric concentration of GHG, and by consequence for the warming trend and all sub-resulting degradations. The IPCC Fifth Assessment report (2013) made it clear that "It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century", which means 95 % of scientific certainty. Projections for the twenty-first century depend on GHG emissions scenarios, but the warming will continue even within the least pessimistic scenario (serious cut in fossil fuel burning and all GHG emissions).

A warming planet affects all natural systems in a vicious circle for long-term reinforcing feedback processes. If emissions continue according to the current pace through the current century, scientists say, the earth could warm by as much as 10 °F above the preindustrial level (Gillis 2014), which would have unexpected terrible cascading effects on human civilization.

Closely interrelated with those geophysical changes, the grievous impact on human security is much deeper than it looks or than it is estimated (i.e., it is expected that a huge number of deaths and considerable economic losses each year will be attributed to climate change risks, especially in the Global South). Environmental change affects communities and economies through contingent effects, and these effects are already being seen and felt today by vulnerable individuals and communities around the world, particularly in regions considered historically the least responsible for generating GHG emissions (UNDP 2014).

Given these conclusions, and taking into consideration the growing scientific consensus on climate change, and the observable occurrence of negative impacts on humans, it could be concluded that scientific debate regardinganthropogenic environmental change is almost complete (Cook et al. 2013a, b). Yet what about political and policy action? Is the scientific consensus paving the way for political implementation? To what extent is environmental change-policy action out of step – or even incompatible – with the existing scientific evidence? Is global environmental governance disregarding explicit links between the environmental crisis and dominant economic pathways?

2.2 Policy Action: Triggers and Limits

The formal discussion on policy response to climate change – as one main aspect of environmental change – focuses on two main approaches so far: mitigation and adaptation-oriented policies. Mitigation policies aim to reduce and stabilize GHG concentration in the atmosphere, while adaptation policies are directed to manage different risks and vulnerabilities caused by the negative impact of climate change on societies, economies, and natural systems. Environmental change is both local and global, thus the governance responses involve policy makers at different scales of space and targets. The policy action to manage the environmental crisis must therefore consider a paradox: the responsibility of policy makers to take into account the available scientific evidence, and therefore precipitate the implementation of rigorous mitigation and adaptation strategies and environmental laws, and at the same time support the market-oriented growth and a dominant culture of consumerism.

The dominant economic paradigm has led to a cultural belief that continuous growth of GDP and percapita income is positively associated with a greater attention to environmental problems (Floro 2012). This seems to be true in terms of defensive activities given the available resources to deal with environmental crisis (Duroy 2005). Indeed, it has been anticipated that the enhancement of environmental regulations come along with material growth, and people with high income tend to care more about environment, and therefore push forword to to set up protecting policies (Inglehart 1997). However, it is now clear that the increase of wealth, and in the amount of consumed goods and services, most often lead to more burning of fossil fuels, to natural resource overuse and to associated GHG emissions (Schandl and West 2010). Additionally, it is increasingly obvious that the GDP growth is not a viable measurement tool of economic well-being and social welfare. The dilemma the environmental policy is currently facing is mainly related to how our societies could improve the quality of life (life satisfaction) without constant pursuit of economic growth, based mostly on natural resource depletion and environmental degradation (Bergmann 2011).

In this respect, and due to the limits of GDP as an indicator of economic performance and social progress, many relevant initiatives (commissions, task forces…)[4] have been established with the aim of developing inclusive indicators, more sensitive to social and environmental dimensions. In addition to the GDP indicator, growth should be measured with reference to social and environmental welfare, facilitating the planning, acceptance and implementation of adequate environmental and social policies

Indeed, the political response to global environmental change is facing serious obstacles that affect its ability to cope with identified causes and consequences. At the first level, mitigation policies, even the toughest ones, will not stop global warming immediately, given the inertia of the climate system, and therefore the outcome of these policies will be merely beneficial for future generations (very likely not born yet). In a context of rapid and unpredictable variation (Doppelt 2006), the 'economic policy transition'to a 'low-carbon economy' imposes very immediate responses due to large-scale reinforcing effects of small changes. In addition, the world's biggest emitters, including some major developing countries[5] still resist robust mitigation strategies despite the fact that past carbon emissions are causing damages around the world with serious impacts especially for most vulnerable people, exposing them to floods, diseases, famine, etc. Also, conflicting interests and positions between the South and the North, and even within existing blocks of alliances, have made the recent multilateral climate negotiations very tough and tense.[6] This undermines international efforts to lower emissions.

Currently, the strong emphasis placed by policy makers on GDP as an indicator of social welfare explains why mitigation policies appear so unattractive to many governments, as the latter may result in a loss of GDP in the short term, and in turn may compromise the chances of re-election. Also, the translation of scientific consensus into policy action is still limited by some level of climate skepticism and the campaign led by lobbying groups and think tanks, mainly supported by manufacturing and petroleum firms with vested interests (McCright et al. 2013), arguing that GEC is not man-made but a natural process.

In addition, public support in wealthy countries for environmental change mitigation policies is still weak due to a 'consensus gap' and a public belief that the scientific certainty proving the anthropogenic nature of global warming is still embryonic (Cook 2013), or that climate science is politically tainted (Hamilton 2014). Indeed, despite the overwhelming scientific evidence, a significant part of public opinion in some countries is prompt to trust denial claims and continues to use a panoply of psychological escape mechanisms that allow citizens to stand against any attempt to change their conventional lifestyles, faithful to conservative political culture, voting for policy makers that are insensible to the environmental crisis discourse. This public misperception about the state of scientific consensus

[4] For instance the Commission on the Measurement of Economic Performance and Social Progress created by French government in 2009 chaired by the economist J.E. Stiglitz.

[5] Invoking their 'right to development'.

[6] The failure of Copenhagen Summit in 2009 was an obvious illustration of these divergences.

regarding the reality and causes of climate change matters a lot. Referring to the case of the United States (since the weak involvement of this key carbon emitter in global climate governance has made the process more or less slow), Maibach et al. (2014)[7] argue: "This misperception among Americans is not only pervasive but also highly consequential […]. Those who do not understand the scientific consensus about human-caused climate change are, in turn, less likely to believe that climate change is happening, human-caused, will have serious consequences, and is solvable (i.e., can be mitigated through concerted action). In addition, not understanding this scientific consensus undermines Americans' support for a broad societal response to the threat. As a result, knowledge of the scientific consensus on human-caused climate change can be considered a 'gateway' cognition; as members of the general public come to understand the consensus, they more likely come to the conclusion that human-caused climate change is happening and harmful".

Maibach et al. (2014) argue again: "The pervasiveness of this misperception is not an accident. Rather, it is the result of a disinformation campaign by individuals and organizations in the United States – and increasingly in other nations around the world[8] […] – who oppose government action to reduce carbon emissions […]. The claim that climate scientists are still arguing over the reality of human-caused climate change was designed to resonate with the sensibilities of political conservatives who are inherently suspicious of government intervention in markets and societies".

The change in perceived scientific consensus is considered by Van Der Linden et al. (2015) as a 'gateway belief' by influencing other key beliefs about climate change. In turn, this could reflect on behavioral and psychological aspects for public engagement and support for public action.

In most countries, public policies to cope with GEC – pertaining to both mitigation and adaptation – are generally conducted in accordance with the dominant economic development models, and within the growth paradigms. These policies intersect with human and socio-economic issues such as human security, equity,

[7] According to Maibach et al. (2014), "Human-caused climate change is happening and is accelerating; dangerous impacts are becoming evident around the world, and are projected to get worse in the decades to come, possibly much worse […]. Nearly all climate scientists are convinced of these basic facts, but more than half of Americans do not currently understand that this scientific consensus has been reached […]. Americans are not alone in this regard, although relatively less is known about the views of people in other nations. While 57 % of Britons aged 15 and older agreed with the statement 'most scientists agree that humans are causing climate change' […], a separate 16-nation World Public Opinion Poll (Public attitudes toward climate change: Findings from a multi-country poll, 2009, http://worldpublicopinion.org/pipa/articles/btenvironmentra/649.php?lb=brglmandpnt=649andnid=andid=) found that only a minority of citizens in seven nations said 'most scientists think the problem is urgent and enough is known to take action'; these were the United States (38 %), Russia (23 %), Indonesia (33 %), Japan (43 %), Brazil (44 %), India (48 %), and Mexico (48 %). Across all 16 nations, 51 % selected this response option, while 16 % said 'most (scientists) think the problem is not urgent, and not enough is known yet to take action', and 24 % said 'views are pretty evenly divided', another 10 % indicated 'don't know'".

[8] While originally launched in the United States, this disinformation campaign has been pursued in Canada, the UK, Australia, and New Zealand as well (Dunlap and McCright 2011).

sustainability, and economic growth. Therefore, political response will depend on our crucial choices with regard to growth, development, kind of society and type of environment we want to live in (Doppelt 2006). Hence, the ability of governments to make public policies successful depends on alternative models based on long-term benefits, neglecting short-term costs and utilitarian logics widely adopted by the environmental economic school.

3 Alternative Paradigms and Pathways

In the assessment models, upon which policy decisions are taken and implemented, monetization prevails through putting a price on what is intrinsically priceless (Ackerman et al. 2008) such as human life, natural ecosystems, and the global commons. The dominant economic models have responded to GEC with regulatory frameworks and solutions inspired by the globalized economy and market-based mechanisms – like carbon market, payments for ecosystem services, and cost-benefit analysis. Hence, large corporations are somehow granted a legal basis to pollute the atmosphere and make carbon cuts as cheap as possible (Bauwens 2011). According to neoliberal environmental economists, the environmental crisis – perceived as a market failure to give right prices to natural resources – is supposed to be solved by the market through price correction, which means economic efficiency. This approach ignores the fact that since resource prices reflect the relative scarcity of different resource types, and not their absolute scarcity (Baumgartner et al. 2006; Lawn 2010), it's not possible to get the right price for absolutely scarce, finite and non-substitutable resources (Sanders 2012). Therefore, this solution remains devoted to 'business as usual' approach that can lead to further natural resource depletion and overuse.

3.1 Sustainable Development

The emergence of the 'sustainable development'concept has reflected the broad awareness by the international community of the urgency to manage the ecological crisis in a way that is balanced with economic and social imperatives. In this regard, although the concept was strongly argued, it was rather perceived by environmentalists like moral injunctions rather than a concrete shift in economic paradigm. The attractiveness of this concept lies on a promise to make compatible ecological, social, and economic imperatives. Furthermore, growth was commonly considered during previous decades as necessary to fund environmental management actions and improve the quality of environment.

Almost three decades later, the objective of poverty eradication prone by the Brundtland Report, as the highest priority, is far from being achieved, not to mention the failure stories in the pursuit of the Millennium Development Goals (MDG's).

This is one of the reasons behind the current adoption of the Sustainable Development Goals (SDGs). In the meantime dematerialization of the economy didn't make it 'less energy-intensive in its impact'(WCED 1987:52). Indeed, dematerialization didn't reduce the material throughput of the economy, neither efficiency equates to less use of resources (Alcott 2008). Regrettably, within this logic, humanity is still unable to solve basic contradictions that undermine the viability of both environmental and human systems.

Some environmental economists blame the economic system, as it is currently designed and working, characterized by uninterrupted trespassing of biological and physical limits of the nature. The theory of limits (Meadows et al. 1992), known to be the basis of the 'sustainable development' construct, is the dominant paradigm for understanding the interactions between the economy and the environment (Daly 1979, 1996), and has effectively been used to raise concerns about the reciprocal correlation between both environment and economic collapses when those limits are reached or exceeded (Davidson 2000). Along the same line, a recent research testifies that humanity is exceeding some of the biophysical interlinked planetary boundaries (Rockström et al. 2009). Schellenhuber and other environmentalists warned against the irreversible consequences on the whole earth climate and ecosystems of crossing the tipping points, such as the melt of arctic ice sheet and the dieback of amazon rainforest (Schellnhuber et al. 2006).

Nevertheless, according to Tainter (1990), the limits paradigm neglected the fact that the human economy is designed to increase social and technological complexity in order to continue to expand, while pursuing ecological overshooting and deepening disparities between the rich and the poor. Such adaptation requires high flow of energy and resources, meaning eventually high levels of unsustainability. This situation sounds like running the planet Earth as if it were a business in liquidation (Sanders 2012). According to Gunderson and Holling (2001), the return to simplicity and sustainable use of natural capital may be a key design criterion to reduce per capita resource flows.

Sustainability has not been interpreted as a matter of human survival that is directly threatened by exponential global physical scale of the economic system, but regrettably been rooted in utilitarian considerations and driven by resource constraints and an assumption that rising prices, resource substitution, technological progress and human ingenuity will overcome the resource scarcity problem of future generations (Nordhaus 1992a). Maximizing present values, slogan of the market logic, is the opposite of sustainability and intergenerational equity. To be sure, the argument that technical change will allow economy to grow in spite of finite resources by pushing nature's limits (Nordhaus 1992b) is rather closer to economic sustainability than it is to sustainable development. In fact, the mainstream economic thought has privileged the 'weak sustainability model' (Ayres and Gowdy 1998; Sanders 2012) arguing that natural capital can be substituted for by financial, manufactured and human capital, instead of adopting the 'strong sustainability model' according to which natural capital stocks are the limiting factor, and must therefore be maintained (Daly 1991, 2005). Biophysical limits are merely recognized in order to prepare our ability to raise the threshold

of economic sustainability, and to prepare a transition to a dematerialized[9] and less high energy-based economy, henceforth wished to be feasible through the global green economy model.

3.2 Green Economy

'Green economy'is currently the buzzword among environmental economists, and represents a new paradigm to solve the contradiction between economic growth, environmental protection, and natural resource preservation. It relies on green technological innovations and green investments to make growth environmentally-friendly. But, what is the potential of this new paradigm to solve the sustainability dilemmain thecontext of a multidimensional global crisis?

The paradigm is proposed to policy makers by a widespread literature of environmental economists – including think tanks, experts, and NGOs – as a roadmap to practically translate the concept of sustainable development and the objectives of intra and intergenerational equity. Nevertheless, the paradigm suffers from the lack of an internationally agreed framework,[10] which is reflected in the design and implementation of interrelated policy measures and strategies. Recently, a modern wave of green economists, spurred by influential international organizations – such as UNEP, European Union (EU), Bretton Woods Institutions (IMF and the World Bank), Organization for Economic Cooperation and Development (OECD), etc. – and other research institutions, initiate guiding principles that frame and clarify the concept of 'green economy'. According to UNEP (2011), green economy refers to an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. Therefore, the green economy roadmap is supposed to be global (relevant to both developed and developing countries), driven by public and private investments that reduce carbon emissions, and oriented to preserve and eventually rebuild natural capital assets, especially for vulnerable regions and populations whose income and security depend strongly on environmental services.

Be it a wishful thinking, a new means to expand corporate control on nature, or a real shift in the prevailing economic paradigm and related growth model, the concept is emerging in a context of global crisis (financial, social, security, and ecological) and unsuspected failure to achieve sustainable development goals – growing inequity and poverty, degradation of natural resources and ecosystems, loss of biodiversity and environmental services. The UNEP 2011 Report on green economy set up a roadmap to Rio+20 and beyond claiming the reallocation of public and

[9] According to the conventional environmental economic thought, economic growth can be sustainable so long as efficiency gains allow the economy to dematerialize by at least the same rate as it grows.

[10] For instance, the UNEP focuses on the 'green economy' while the OECD and the World Bank refer sometimes to 'sustainable growth' and 'green growth'.

private investments to enhance natural capital, resource efficiency, and renewable energy. Thus, the green economy is grounded in an optimistic scenario where the green investments are expected to enable GDPs to grow higher than currently, to create more and better jobs, and to alleviate poverty on a long-term perspective. Some new environmentalists even recognize it as the capitalism's best hope to create jobs, restore growth, and limit climate change (Jessop 2011).

Nevertheless, certain environmentalists contest the green economy agenda because it is perceived as vaguely connected to social and ecological systems, and fearing that claims for the required structural changes of the economic system will be captured by powerful economic agents. The global green economy roadmap is also criticized for being a diverted way enabling capitalistic interests to create new sources of profit and growth through putting price value to each component of natural capital (payment for ecosystem services). In terms of implementation, the green economy policies are facing serious limits given the political and financial weight of large corporations, and "the global operation of the political and economic relationships that today dominate the planet"(Lander 2011:4).

According to Lander (2011), authors of the UNEP 2011 Report opted to ignore the fact that the capacity of existing political systems to establish regulations and restrictions to the free operation of the markets – even when a large majority of the population calls for them – is seriously limited by the political and financial power of the corporations. This is particularly evident in some countries like the United States. No environmental regulatory policy and no international commitment can be assumed by the government of that country if it does not have the prior approval of the major corporations potentially affected by the measures. In fact, these corporations have the capacity to veto the policies with which they do not agree. They demonstrate this powerfully in the way the United States has been prevented from making any commitment to reduce GHG emissions in the United Nations climate change negotiations, and in the way they have prevented the passing of even the most timid environmental regulations that have been proposed in recent years. For governments, the political cost of affecting corporate interests is simply too high.[11]

The arguments advanced by green economy proponents look pertinent, especially the one related to the misallocation of the capital as being the source of the dilemma between economic progress and environmental sustainability. However, we believe that a 'market failure' (UNEP 2011) could not be solved by exclusively led market policies, established as a dogma to deal with all crises. Many analysts consider such policies and regulations as extensively committed to guarantee high profits for green investors, and make their businesses more competitive than it is in the 'brown economy'. Thereby, the panacea of green economy is vowed predominately to defend extension of the free market to natural capital (Lander 2011:4), with the same flawed paradigms that are responsible for global crisis, including environmental crisis.

Generally, the absorption of nature into economic calculation deeply brittle some basic principles already transgressed by the dominant model of development,

[11] For more details: http://www.tni.org/report/green-economy-wolf-sheeps-clothing.

mainly two old nowadays revived central concepts: natural commons (rights of mother earth) and human security (rights of all humans to live in dignity and freed from all risks). Both concepts are tightly linked to social justice and intergenerational equity, and may be adopted as a basis to set up new indicators to assess societal progress and wellbeing, particularly in current process of defining and implementing a post-2015 development agenda and sustainable development goals (SDGs) by the United Nations.[12]

4 Towards a Human Security-Centered Approach

The joint efforts of economists and environmentalists to propose alternative paradigms of sustainable development and green economy aim to replace current growth models with their negative environmental and social externalities. These paradigms tend to combine relevant criteria, such as efficiency and sustainability, but have been criticized for being anchored in the dominant economic paradigm (Sanders 2012), and associated with connotations and reform options "accepted by the realpolitik and the economy" (Unmüßig et al. 2012). The following analysis will focus on the human security-centered approach as a core paradigm that offers real alternatives to drive an overall transformation of the system, and capable to target within this transformation human security, and "by ricochet" the whole environment.

Less well explored in the field of actions, the concept of human security is both an epistemological tool for describing an empirical reality and a normative concept signaling the way the world should be and marking where change is needed. The very essence of the human security concept is its ability to stand at the core of the future we want for our civilization, because it is focused on human beings, and the fight against every single threat to their security.

According to Purgess (2009:49), the long debate on the meaning, nature and scope of the concept of human security has come full circle. Its epistemological pretences and methodological abilities have been discussed by analysts seeking to better grasp the world around them and to draw clearer and more meaningful conclusions about the security landscape as it is.

Human beings have always sought to secure themselves and their livelihoods from natural or man-made threats. This struggle for security is becoming more and more complicated insofar that most perils are increasingly provoked by human impacts on the environment. The following analysis explores the interrelations between human security and environmental security, highlights related implications, and investigates the relevance of using the human security approach as an entry point to manage GEC.

[12] For more details: https://sustainabledevelopment.un.org/post2015

4.1 Environmental Security as a Catalyst for Human Security

At the root of the emergence of environmental security field occurs a paradigmatic shift in the meaning of security from a traditional view – focused on national security and narrowed by nation-state boundaries – to a new people-centered approach. The focus on military defense to ensure the security of citizens has failed for two main reasons: First, because it is considered from the state rather than human-security perspective; secondly, because it ignores non military threats like those related to environmental risks (Brown 1977; Ullman 1993).

The rethinking of human security has been parallel to another interlinked paradigmatic shift in development economics as emphasis became less on per capita income and more on human well-being and fair distribution of wealth among individuals, communities, regions and countries (UNDP 1994). The development and security literature have been elaborated into intersected approach linking human security to human development (Ul haq 1996). The UNDP 1994 Human Development Report catalyzed this common interest in "human life and dignity", targeted to position human security as an organizing concept to deal with threats from multiple sources.

Although the concept has gained prominent importance among academic and policy circles, and considered by some countries as a key driver of foreign policy agenda,[13] it still lacks a commonly clear and measurable definition (King and Murray 2002). This prevents using the concept as a relevant reference for national and international policies aiming at improving human condition. For the purpose of this research, we recognize some international regulatory and policy frameworks where human security synthesizes all concerns for basic needs, human development, and human rights (Gasper 2005). We also refer to some recent literature that confers consistency and practical meaning to the human security concept, for instance by using some measurement methods (King and Murray 2002).

For our reasoning, we will use a clear, comprehensive and a working definition proposed by the Japanese Foreign Ministry (1999): “human security comprehensively covers all the menaces that threaten human survival, daily life and dignity – for example, environmental degradation, violations of human rights, transnational organized crime, illicit drugs, refugees, poverty, anti-personnel landmines and other infectious diseases such as AIDS – and strengthens efforts to confront these threats”. Also, with reference to the UNDP definition,[14] human security is regarded from a global perspective, through interdependent components, prevention-oriented, and people-centered. These four characteristics emphasize a double connection between human security and GEC (UNDP 1994).

[13] Canada, Japan and Norway are the leading countries for this modern view of human security.

[14] The 1994 UNDP Human Development Report has broadly defined human security as ‘freedom from fear’ and ‘freedom from want’.

4.2 Human Security Heavily Threatened by GEC

Critics who suggest that the human security concept is too broad and all-encompassing are to be questioned, since the current threats and risks are interlinked, complex, and not mutually exclusive. For our purpose, we believe that global environmental change, aside from being a source of non-military threats to national security (Barnett 2001), turns out to be a contributing factor to conflicts and instability (Barnett and Adger 2007), playing a catalyzing effect on all other threats.[15] In fact, the environmental factor appears to be the most important component as it impacts and somehow directly triggers or amplifies the other threats. Here are a few examples to figure out this interrelation: The scarcity of some natural resources (i.e. water) may lead to a violent conflict, in the same way that forced migration (caused by GEC) is synonym of deprivation and deep insecurity, and it may lead to conflict in host communities (Barnett and Adger 2007). Insufficiency of food resources caused by fisheries depletion, land degradation, water shortage, extreme weather events, etc. results in malnutrition, hunger and health problems. Furthermore, considering that the ecological degradation is causing a gradual failure of the whole system on which depend our lives and livelihoods, we can assume – as a result – that the GEC has the potential to deeply affect the future generations more than any other risks. Regarded from a global and measurable scale – global warming scenarios and related expected effects – human security has never been so challenged throughout the human history as it is today.[16]

With regard to the human security's four characteristics mentioned above, the GEC spreads out of the state traditional security logic, and make it unavailing. It undermines the most basic material and psychological needs of most vulnerable people, and weakens the freedom of future generations to live with sufficiently renewable natural resources. More precisely, the depletion of these resources – besides having physical and social adverse externalities (dissatisfaction of basic needs) – may interact with a range of economic, political, social, and cultural processes, intensify competition over these resources, and increase directly the likelihood of violent conflicts among communities and states (Dixon and Blitt 1998). In the academic sphere of environmental security, it was assumed that the environment might be a factor of international cooperation; however, this potential shift will remain dependent on the condition to place the GEC on the top of international human security agendas, and on the nature of geostrategic interstate tensions and dynamics.

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[15] According to a study published by the National Science Foundation in 2015, an extreme drought in Syria between 2006 and 2009 was most likely due to climate change, and that the drought was a factor behind the violent uprising that began there in 2011. For more details see the article appeared in New York Times on March 3, 2015. URL: http://www.nytimes.com/2015/03/03/science/earth/study-links-syria-conflict-to-drought-caused-by-climate-change.html?_r=0

[16] If we consider the most optimistic scenario of global warming (according to IPCC), the surface temperature will still increase by 2–4 °Cby the year 2100.

From another point of view, and according to Dalby (2002), "international relations operates on the basic assumption that states, given sovereign recognition in common, are at least legally equivalent units in the international system. Granted some are more powerful than others, but their rights in terms of international legal personality and their privileges granted in terms of sovereignty are assumed to make them the key actors in international politics. But shifting the focus to global changes suggests that this assumption is not necessarily a useful starting point for thinking about what is still inadequately understood in terms of environment. Clearly the transboundary 'flows' of environmental politics have challenged the assumptions of sovereignty in many ways that require international cooperation on many themes. In this sense, the 'greening' of sovereignty is occurring and the importance of international cooperation made evident, but environmental themes also do point to the limits of thinking in terms of sovereignty in the first place".

Hence, GEC is a multidimensional question of human security and is increasingly understood as a central and globally shared issue. Longtime framed as a discourse rooted in natural sciences and restricted to environmental externalities, GEC research begins to be increasingly approached from the point of view of its social externalities (O'Brien 2006) and newly from geostrategic externalities (Valantin 2013). Based on this approach, which views GEC as inherently a social problem (Barnett et al. 2010), which affects human security through many complex social processes (such as violence, discrimination, marginalization and exploitation), it is a social and human security based approach that must be considered the unavoidable path to tackle GEC since individuals and communities have the capacity and freedom to exercise enough options to end, avoid or to adapt to environmental change (GECHS 1999).

4.3 Human Security Approach to Tackle GEC

State-led approaches to securitize policies for tackling environmental change have shown little ability to prompt appropriately scaled policies in order to tackle environmental change, whereas the securitization constructed by people and communities (bottom-up led approaches) can put pressure on governmentsand consequently push policy makers to effectively respond to environmental change whilst prioritizing people's needs, values, rights, and equity within and between social groups and generations. At the first level, ahuman security approach promotes empowerment strategies by individuals and communities, with a focus on enabling them to maintain their livelihoodsin the face of social and environmental changes (Barnett 2008). Further, reframing environmental change as a human security issue will certainly expand the scope and heighten the relevance of the addressed issues to include an emphasis on equity, social justice, vulnerability, power relations, and the security of humans not born yet (O'Brien 2006). Refocused on human security, approaches to tackle GEC could very likely gather scientists and research institutions from all disciplines whilst connecting environmental change to their diverse core concerns.

The environmental crisis is intimately connected to the human and socio-economic context within which we live; this is the reason why the approach to address this crisis and solutions to cope with it must consider its interaction with contemporary economic structures, development paths, and powerful interests (O'Brien 2006). Human security is paradoxically most challenged and weakened in the "Anthropocene" era, where humanity is the most powerful geological force on Earth, because we are making the Earth a hostile, and in some cases, a non viable place for humans and other species.

More essentially, the human security approach is definitely used to raise new consistent solutions and policies that are not necessarily conceived within the imperatives of the capitalistic economic system, nor dominated by formal modeling (Dietz and Stern 2008). According to a new wave of scholars of environmental security,[17] environmental change can only be resolved by considering it as a human security issue. While there is a need for far-reaching policies to directly tackle environmental change, these policies also have the duty to target all sources of vulnerability and triggers that may intensify the effects of global change, and hinder people from appropriately adapting and responding to environmental crisis outcomes.

Approaching GEC from a human security perspective can contribute to the creation of regulations that are multidimensional and which comprise not only technical solutions(such as low emissions, green investments), but also address the socio-economic causes and consequences of global change, including poverty, inequality, failure of economic strategies, and failure of financial markets and international trade to reduce or even stabilize rich-poor gaps. The IPCC 2012 report made it clear: "A prerequisite for sustainability in the context of climate change is addressing the underlying causes of vulnerability, including the structural inequalities that create and sustain poverty and constrain access to resources" (IPCC 2012:20). Thus, the conception and implementation of effective solutions to the environmental crisis require powerful authorities willing to enforce strong policies and able to introduce real alternatives to the established economic system. From the same perspective, communities and individuals around the world should engage with the need for the concrete transformations that are crucial to sustaining human life on earth. Encouraging citizens to vote for governments that are strongly committed to take a robust climate and environmental action, even in opposition to corporate interests, may be an efficient way to make change.[18]

From the perspective of the global climate agreement adopted during the COP 21 in Paris by the end of 2015, one should remember that some trade-offs are inevi-

[17] A large literature emerged during the last decade aiming to address environmental change as a human security challenge. For more analysis on this issue, see (Barnett 2007; Dokos et al. 2008; Brauch 2012).

[18] As an illustration of this situation, it was reported by Gillis and Davenport (2014) that during the last two years, The US president and his aides have pushed for citizens to increase the pressure for governmental action, based on the premise that only popular protest can overcome the resistance in Congress.

table, especially when the rich lifestyle of a global minority threatens the human security of the majority. Certainly, we believe that the point is not to choose between economic growth and environmental protection, but to banish any further attempts to make benefits at the expense of the viability of social and ecological systems. Based on this, we support the idea that the current global environmental governance system, aiming at protecting the environment and coping with GEC, needs to be rethought through two fundamental concepts: global social justice and human security.

5 Conclusion

This chapter highlights our reservations on development perspectives based on GDP growth, and on the prevailing discourse founded on sustainable development and the green economy. Instead, we argue that a human security perspective is able to reflect the needs, aspirations of individuals and communities, hence facilitating their empowerment to influence and contribute to public policies.

The paradigmatic shift framing global environmental change as a human security threat, as supported by this analysis, must not be taken over by any political interest for its own ends, nor manipulated for short electoral purposes. It must be placed beyond divergent agendas as a worldwide multi-dimensional "social contract" which exhorts governments and international institutions to protect people from imminent threats, including non-military ones such GEC. To those who see it as being too idealistic, the answer is that the issues at stake are intrinsically incompatible with the zero-sum game logic. Global environmental change threatens poor as well as the rich countries and communities across the world. The fight against social vulnerabilities and environmental crisis must be united and global. Since the interrelations between social and ecological systems are growing at different scales, efficient coping strategies will have positive impacts globally, but any inertia will further deepen the inequalities worldwide, but more severely in the Global South with untold negative consequences.

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